REMARKS

Applicants thank the Examiner for withdrawing the application from appeal in view of Applicants' July 11, 2005 Appeal Brief, and for reopening the examination of this application.

In the October 20, 2005 Office Action, claims 1 and 2 were rejected under 35 U.S.C. 102(b) as allegedly anticipated by U.S. Patent 5,530,759 to Braudaway et al. (hereinafter "Braudaway"); claims 1-4 were rejected as allegedly unpatentable under 35 U.S.C. 103(a) over newly-cited U.S. Patent 6,031,914 to Tewfik et al. (hereinafter "Twefik") in view of the prior art; and claim 5 was rejected as allegedly unpatentable under 35 U.S.C. 103(a) over Tewfik in view of U.S. Patent No. 5,809,139 to Girod et al. (hereinafter "Girod"). Applicants respectfully traverse all rejections of record.

Rejections under 35 U.S.C. § 102(b) for alleged lack of novelty

Claims 1 and 2 were rejected under 35 U.S.C. § 102 as allegedly anticipated by Braudaway.

As Applicants explained in the July 6, 2005 Appeal Brief submitted in this application, claim 1 is not anticipated by Braudaway for at least the following reasons:

Claim 1 recites a method for including a watermark in a digital image,

comprising:

obtaining digital data of a transformed representation of the image;

determining a transformed representation of the watermark for optimized visibility of the watermark in the image; and

superposing the transformed representation of the watermark on the transformed representation of the image.

As described above, the present invention is directed to a method for watermarking of digital video images in a *transform* domain. (Specification, page 1, lines 4-6; p. 2, lns. 5-6).

Braudaway is directed to a system for placing a visible watermark on a digital image, where an image of the watermark is combined with the digital image. (Braudaway, Abstract). The pixels of the watermark image are examined, and for each pixel whose value is not a specified "transparent" value, the corresponding pixel of the original image is modified by changing the brightness of the pixel but not the color. (Braudaway, col. 2, lns. 6-14).

However, Braudaway differs from the claimed invention at least in that it fails to disclose or suggest that the optimal visibility of the *transformed* representation of the watermark is determined based on the *transformed* representation of the image, as recited

in claim 1. For example, for MPEG video images, the transformed representation is the DCT of the image blocks or the motion compensation prediction errors. Braudaway describes that the optimized visibility is determined based on the *luminance value of each pixel* of the image *in the untransformed (i.e., pixel) domain.* In contrast, the method claim 1 determines optimal visibility of the transform coefficients of the watermark directly based on the transform coefficients of the images *without decoding of transform coefficients of the image*. Nothing in Braudaway discloses or suggests such a technique. The claimed method for determining optimal visibility of the transform coefficients of the watermark is different from the method described by Braudaway, which is performed in the *untransformed,* or *pixel domain.*

Braudaway therefore fails to disclose or suggest at least the claimed steps of :

obtaining digital data of a *transformed representation of the image*;

determining a transformed representation of the watermark for optimized visibility of the watermark in the image; and

superposing the transformed representation of the watermark on the transformed representation of the image.

Moreover, Braudaway is directed to solving a very different problem from the present invention. As stated in Braudaway:

> While watermarking is an effective way for copyright and media owners to control the use of their images, conventional watermarking processes can alter the chromaticities of the original image at points where the watermark appears. This effect may be undesirable from the perspective of both the view and the owner of the original image.
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> Braudaway, col. 1, lns. 56-61.
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> In light of the above, it is an object of the present invention to provide a digital watermark that preserves the chromaticities of the original image.
> Braudaway, col. 1, lns. 56-67.

Indeed, Braudaway's only concern is to ensure that a digital watermark, implemented in the pixel domain, does not affect chromaticities/color of the modified image pixels. Braudaway's concern with color is further evidenced by the lengthy background discussion of "color theory" provided in the detailed description of the invention. (See Braudaway, col. 2, ln. 37 – col. 4, ln. 4).

The present invention, on the other hand, relates to solving the problem of increased efficacy, or robustness, of watermarks, and particularly in digital video images. (Specification, p. 9, lns. 8-18). Importantly, Applicants accounted for the work of Braudaway et al. in the "Background of the Invention" portion of the specification as filed. For example, Applicants note that "[o]ne robust way of including a visible watermark in a digitized image is described by Braudaway et al. . . . A luminance level, ΔL, is selected for the strength of the watermark, and the luminance of each individual pixel of the image is

modified by ΔL and a nonlinear function." (Specification, p. 1, lns. 23-30). The specification of the present application credits the work of Braudaway et al. for watermarking digital images *in the pixel domain* by changing brightness of pixels without changing the chromaticities. (*See* Specification, p. 4, lns. 10-12).

Accordingly, Braudaway fails to disclose or suggest all limitations of the invention of claim 1. Because Braudaway does not disclose each and every element of the claimed invention, it cannot be used as the basis for anticipation under 35 U.S.C. § 102. As such, Applicants respectfully request reversal of the Examiner's rejections. Additionally, because claims 2-4 depend from claim 1 and include all of the limitations of claim, Applicants' respectfully request reversal of the Examiner's rejections of claims 2-4 for at least these reasons.

For the above reasons, as discussed in Applicants' Appeal Brief, Applicants respectfully submit that the rejections of record in view of Braudaway should be withdrawn.

Furthermore, the Examiner indicates in the Office Action that "Applicants argue limitations that are not in the claims, for instance the subject matter 'without decoding transform coefficients of the image' and 'transform coefficients of the

watermark' are not in the claim." (Office Action, p. 5). Applicants respectfully disagree with the Examiner's positions in this respect. Regarding the Applicants' remarks quoted above, it would be understood by one of ordinary skill in the art that these features are inherent in view of the language recited in claim 1, namely, "obtaining digital data *of a transformed representation of the image*," "determining *a transformed representation of the watermark*," and "superposing *the transformed representation of the watermark on the transformed representation of the image*." One of ordinary skill would understand, based on the performance of the recited steps *in the transform domain*, that Applicants arguments very clearly apply to distinguish the claims from Braudaway. As Applicants have indicated previously, Braudaway relates to watermarking *in the uncompressed, pixel domain*, and *not* in the *transform domain*. Applicants' arguments as quoted above are accurate and apply to distinguish the claimed invention from the very different system of Braudaway.

Regarding claim 2, the Examiner asserts that "[c]laim 2 is disclosed, because of the subtracting and clipping operation that happened in items 206, 212 of Fig. 2." (Office Action, p. 2). However, "subtracting" and "clipping" operations are completely different from the recited *compressing* of claim 2. Accordingly, Applicants respectfully submit that the rejection of claim 2 is improper, because the Examiner has not demonstrated that

Braudaway discloses every limitation of the claim. Withdrawal of this rejection and allowance of claim 2 are respectfully requested.

Rejections under 35 U.S.C. § 103(a) for alleged obviousness

Claims 1-4 were rejected as allegedly unpatentable under 35 U.S.C. 103(a) over newly-cited U.S. Patent 6,031,914 to Tewfik et al. (hereinafter "Twefik") in view of the prior art, and claim 5 was rejected as allegedly unpatentable under 35 U.S.C. 103(a) over Tewfik in view of U.S. Patent No. 5,809,139 to Girod et al.

Tewfik relates to "[a] technique for hiding of data, including watermarks, in human perceptible images." (Tewfik, Abstract). The system employs "perceptual masking models to determine the optimal locations within host data to insert the hidden data or watermark." (Tewfik, col. 2, lns. 45-47). As explained by Tewfik:

> Data hiding in general, and watermarking in particular, typically must satisfy the following requirements to be useful: they must be invisible, and they must be robust.
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> Tewfik, col. 2, lns. 1-3.

Accordingly, not only does Tewfik fail to disclose or suggest the claimed superimposing of a transformed representation of the watermark "for optimized visibility of the watermark in the image," but it teaches *precisely the opposite*. If anything, it is clear that one of skill in the art would not look to the system of Tewfik, the entire thrust of which

is to provide hidden data in images, in order to create the system of the present invention, the entire purpose of which is the opposite, i.e., to make a watermark in a digital image even more visible. As described in the background of the present invention, "[i]n digital video technology, watermarks are being used to betoken certain proprietary rights such as a copyright, for example." (Specification, lns. 16-17).

On. p. 3 of the Office Action, the Examiner recognizes this important distinction between Twefik and the present invention, and notes:

> However, Tewfik suggests a visible watermark (see col. 7 lines 49-52); thus, optimized the visibility of the watermark image, as claimed, is at the level of one of odrinary skill in the art in view of Tewfik's disclosure, because Tewfik teaches or suggests visible watermark as pointed out above.
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> Office Action, p. 3.

However, the citation in Tewfik actually refers to a portion of the system which aids in masking a visible watermark, which is very clearly different from the claimed "*optimized visibility* of the watermark in the image." The citation to Tewfik reads:

> In this model, each watermark coefficient is compared with the tolerable error level obtained to assure that it is invisible. A visible watermark is rescaled via the weighting factor."
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> Tewfik, col. 7, lns. 49-52 (emphasis added).

Accordingly, for at least the reasons above, Tewfik cannot possibly render

unpatentable the present invention as recited in claims 1-5. Accordingly, Applicants respectfully request that the rejections of record be withdrawn and the claims allowed.

CONCLUSION

In view of the foregoing amendment and remarks, favorable consideration and allowance of claims 1-5 are respectfully solicited. In the event that the application is not deemed in condition for allowance, the examiner is invited to contact the undersigned in an effort to advance the prosecution of this application.

Respectfully submitted,

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